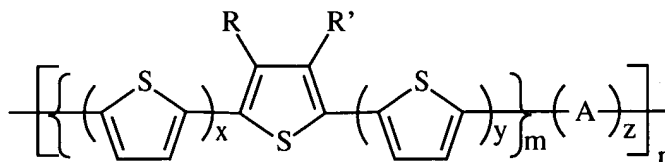


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WHAT IS CLAIMED IS:

1. Polythiophenes of the formula

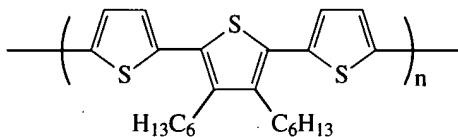


wherein R and R' are side chains; A is a divalent linkage; x and y represent the number of unsubstituted thienylene units; z is 0 or 1, and wherein the sum of x and y is greater than zero; m represents the number of segments; and n represents the degree of polymerization.

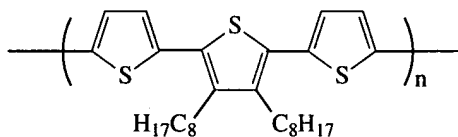
2. A polythiophene in accordance with claim 1 wherein said side chains R, and R' are independently selected from the group consisting of alkyl, alkyl derivatives of alkoxyalkyl; siloxy-substituted alkyl, perhaloalkyl and polyether; said A is an alkylene or arylene optionally of phenylene, biphenylene, phenanthrenylene, dihydrophenanthrenylene, fluorenylene, oligoarylene, methylene, polymethylene, dialkylmethylene, dioxyalkylene, dioxyarylene, or oligoethylene oxide; and n is from about 5 to about 5,000.

3. A polythiophene in accordance with **claim 1** wherein the number average molecular weight (M_n) of the polythiophenes is from about 2,000 to about 100,000 and the weight average molecular weight (M_w) is from about 4,000 to about 500,000, both as measured by gel permeation chromatography using polystyrene standards.

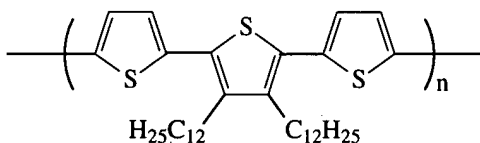
4. A polythiophene in accordance with **claim 1** wherein said polythiophene is (1), (2), (3), (4), (5), or (6)



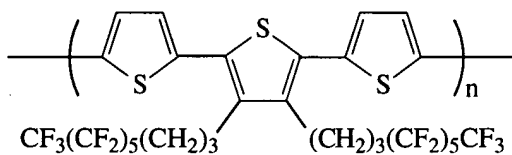
(1)



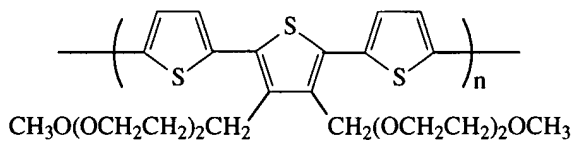
(2)



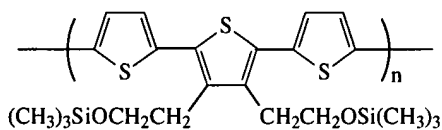
(3)



(4)

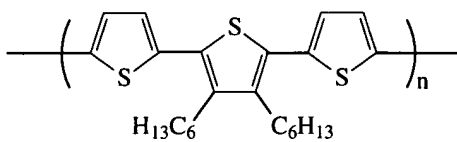


(5)

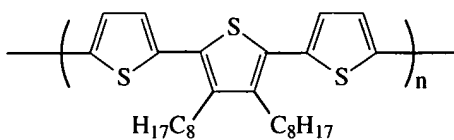


(6)

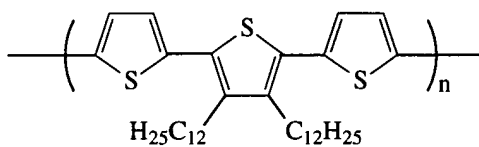
5. A polythiophene in accordance with **claim 1** wherein said polythiophene is (1), (2), or (3)



(1)



(2)

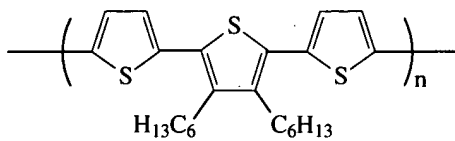


(3)

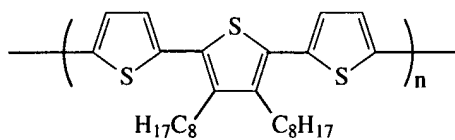
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6. A polythiophene in accordance with **claim 1** represented

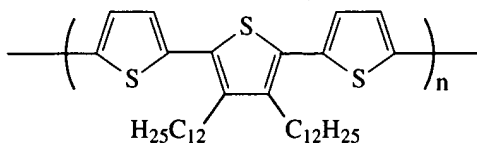
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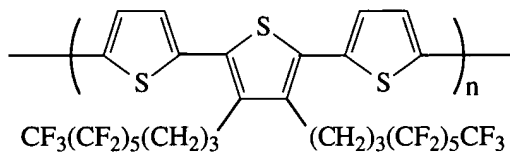
(1)



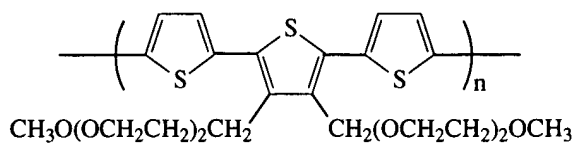
(2)



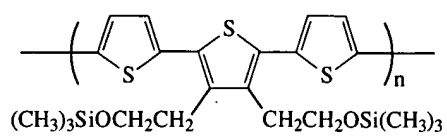
(3)



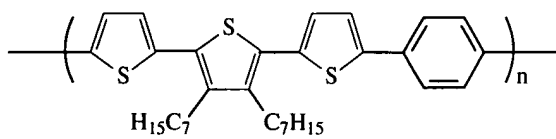
(4)



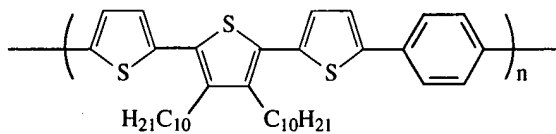
(5)



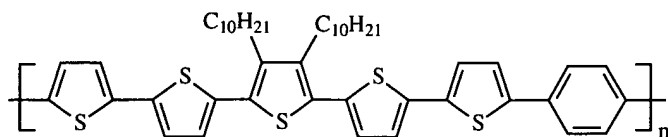
(6)



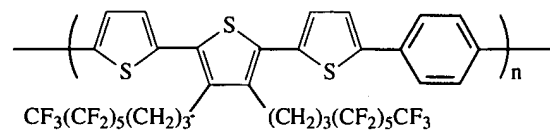
(7)



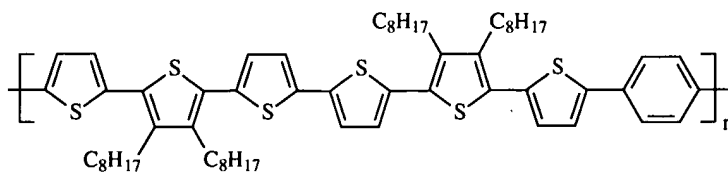
(8)



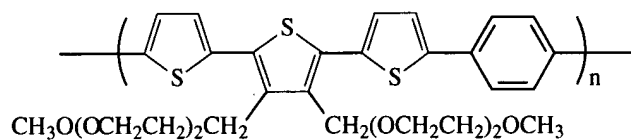
(9)



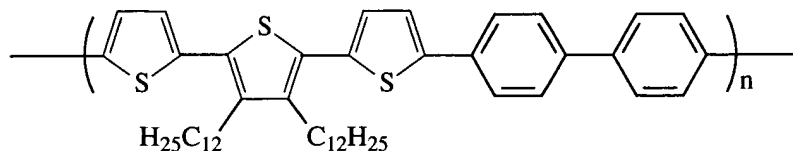
(10)



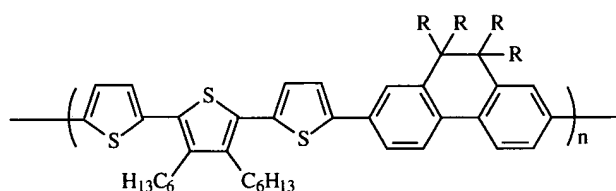
(11)



(12)



(13)



(14)

7. A polythiophene in accordance with **claim 1** wherein x is a number of from zero to about 10, z is zero or 1, and m is from 1 to about 5.

8. A polythiophene in accordance with **claim 1** wherein x is a number of from about 1 to about 7, z is zero or 1, m is from 1 to about 5, and n is from about 5 to about 3,000.

9. A polythiophene in accordance with **claim 2** wherein said polyhaloalkyl is a perfluoroalkyl.

10. A polythiophene in accordance with **claim 1** wherein M_w for said polythiophene is from about 5,000 to about 100,000, M_n is from about 4,000 to about 50,000; said side chain is alkyl with from about 1 to about 25 carbon atoms, or alkoxy with from 1 to about 25 carbon atoms, and A is an arylene.

11. A polythiophene in accordance with **claim 1** wherein said R and R' contain from about 3 to about 20 carbon atoms.

12. A polythiophene in accordance with **claim 1** wherein R and R' are independently selected from the group consisting of alkyl, alkyl derivatives of alkoxyalkyl; siloxy-substituted alkyl, perhaloalkyl of perfluoroalkyl and polyether; A is selected from the group consisting of arylene of phenylene, biphenylene, phenanthrenylene, dihydrophenanthrenylene, fluorenylene, dioxyalkylene, and dioxyarylene.

13. A polythiophene in accordance with **claim 1** wherein said R and R' are independently selected from the group consisting of propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, and isomers thereof.

14. A polythiophene in accordance with **claim 1** wherein R and R' are selected from the group consisting of hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, and pentadecyl; A is selected from the group consisting of phenylene, biphenylene, and fluorenylene; x and y are each independently a number of from zero to about 10; and m is a number of from 1 to about 5.

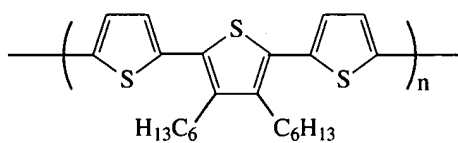
15. A polythiophene in accordance with **claim 1** wherein n is from about 5 to about 5,000; the number average molecular weight (M_n) of the polythiophene is from about 2,000 to about 100,000; weight average molecular weight (M_w) is from about 4,000 to about 500,000, both as measured by gel permeation chromatography using polystyrene standards.

16. A polythiophene in accordance with **claim 1** wherein A is phenylene, biphenylene, or fluorenylene.

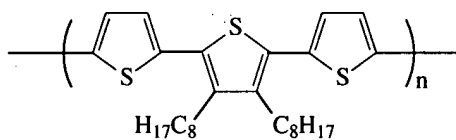
17. A polythiophene in accordance with **claim 1** wherein n is from about 5 to about 5,000.

18. A polythiophene in accordance with **claim 1** wherein n is from about 10 to about 1,000.

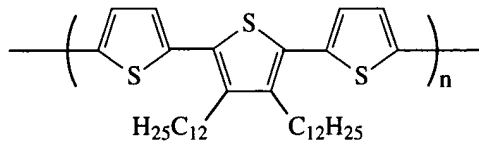
19. A polythiophene in accordance with **claim 1** wherein said polythiophene is selected from the group consisting of polythiophenes of Formulas (1) through (8)



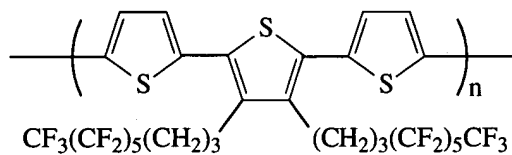
(1)



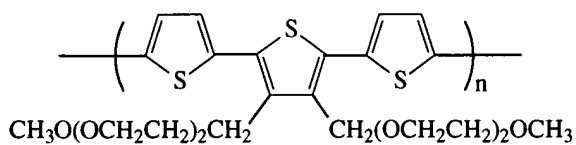
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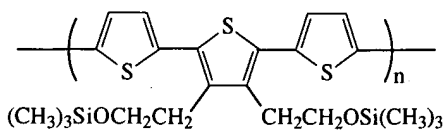
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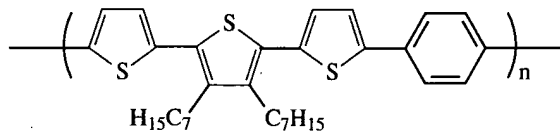
(4)



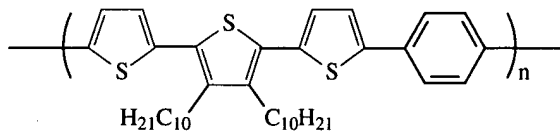
(5)



(6)



(7)



(8)

20. A polythiophene in accordance with **claim 1** wherein x, y and m are from 1 to 3, and z is 0 or 1.

21. A polythiophene in accordance with **claim 1** wherein x, y and m are 1, and z is 0 or 1.

22. A polythiophene in accordance with **claim 1** wherein x, y are from 0 to 3, m is from 1 to 3, and z is 0 or 1.

23. A polythiophene in accordance with **claim 1** wherein x, y and m are 1, and z is 0.

24. A polythiophene in accordance with **claim 1** wherein M_n is from about 4,000 to about 50,000, and M_w is from about 5,000 to about 100,000.

25. A polythiophene in accordance with **claim 1** wherein the sum of x and y is from about 1 to about 10.

26. A polythiophene in accordance with claim 1 wherein the sum of x and y is from about 1 to about 5.

27. A polythiophene in accordance with claim 1 wherein n is from about 10 to about 1,000, and m is from about 1 to about 5.

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